I. *Conſiderations on the Change of the Latitudes of ſome of the principal fixt Stars.* By Edmund Halley, R. S. Sec.

HAving of late had occaſion to examine the quantity of the Preceſſion of the Equinoctial Points, I took the pains to compare the Declinations of the fixt Stars delivered by *Ptolomy*, in the 3*d* Chapter of the 7*th* Book of his *Almag.* as obſerved by *Timocharis* and *Ariſtyllus* near 300 Years before *Chriſt*, and by *Hipparchus* about 170 Years after them, that is about 130 Years before *Chriſt*, with what we now find: and by the reſult of very many Calculations, I concluded that the fixt Stars in 1800 Years were advanced ſomewhat more than 25 degrees in Longitude, or that the Preceſſion is ſomewhat more than 50″ *per ann.* But that with ſo much uncertainty, by reaſon of the imperfect Obſervations of the Ancients, that I have choſen in my Tables to adhere to the even proportion of five Minutes in ſix Years, which from other Principles we are aſſured is very near the Truth. But while I was upon this Enquiry, I was ſurprized to find the Latitudes of three of the principal Stars in Heaven directly to contradict the ſuppoſed greater *Obliquity* of the *Ecliptick*, which ſeems confirmed by the Latitudes of moſt of the reſt; they being ſet down in the old Catalogue, as if the Plain of the Earths Orb had changed its Situation, among the fixt Stars, about 20′ ſince the time of *Hipparchus*. Particularly all the Stars in *Gemini* are put down, thoſe to the *Northward* of the Ecliptick, with ſo much leſs Latitude than we find, and thoſe to the *Southward* with ſo much more *Southerly*

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Latitude. Yet the three Stars *Palilicium* or the *Bulls* Eye, *Sirius* and *Arcturus* do contradict this Rule directly: for by it, *Palilicium* being in the days of *Hipparchus* in about 10 *gr.* of *Taurus* ought to be about 15 Min. more *Southerly* than at preſent, and *Sirius* being then in about 15 of *Gemini* ought to be 20 Min. more *Southerly* than now; yet *è contra Ptolomy* places the firſt 20 Min. and the other 22 more *Northerly* in Latitude than we now find them. Nor are theſe errors of Tranſcription, but are proved to be right by the declinations of them ſet down by *Ptolomy*, as obſerved by *Timocharis*, *Hipparchus* and himſelf, which ſhew that thoſe Latitudes are the ſame as thoſe Authors intended. As to *Arcturus*, he is too near the Equinoctial Colure, to argue from him concerning the change of the Obliquity of the Ecliptick, but *Ptolomy* gives him 33′ more *North* Latitude than he now has; and that greater Latitude is likewiſe confirmed by the Declinations delivered by the aboveſaid Obſervers. So then all theſe three Stars are found to be above half a degree more *Southerly* at this time than the Antients reckoned them. When on the contrary at the ſame time the bright Shoulder of *Orion* has in *Ptolomy* almoſt a degree more *Southerly* Latitude than at preſent. What ſhall we ſay then? It is ſcarce credible that the Antients could be deceived in ſo plain a matter, three Obſervers confirming each other. Again theſe Stars being the moſt conſpicuous in Heaven, are in all probability the neareſt to the Earth, and if they have any particular Motion of their own, it is moſt likely to be perceived in them, which in ſo long a time as 1800 Years may ſhew it ſelf by the alteration of their places, though it be utterly imperceptible in the ſpace of a ſingle Century of Years. Yet as to *Sirius* it may be obſerved that *Tycho Brahe* makes him 2 Min. more *Northerly* than we now find him, whereas he ought to be above as much

much more *Southerly* from his Ecliptick, (whoſe Obliquity he makes 2 ½ greater than we eſteem it at preſent) differing in the whole 4 ½ Min. One half of this difference may perhaps be excuſed, if refraction were not allowed in this Caſe by *Tycho*; yet two Minutes, in ſuch a Star as *Sirius*, is ſomewhat too much for him to be miſtaken.

But a further and more evident proof of this change is drawn from the Obſervation of the application of the Moon to *Palilicium Anno Chriſti* 509 *Mart.* 11°. when in the beginning of the Night the Moon was ſeen to follow that Star very near, and ſeemed to have Eclipſed it, ἐπέβαλλε γὰρ ὁ ἀστὴρ τῷ παρὰ τὴν διχοτομίαν μέρει τῆς κυρτῆς περιφερείας τοῦ πεφωτισμένου μέρους. *i. e. Stella appoſita erat parti per quam biſecabatur limbus Lunæ illuminatus*, as *Bullialdus*, to whom we are beholden for this Antient Obſervation has tranſlated it. Now from the undoubted principles of Aſtronomy, it was impoſſible for this to be true at *Athens*, or near it, unleſs the Latitude of *Palilicium* were much leſs than we at this time find it. *Vide Bullialdi Aſtr. Philolaica, pag.* 172.

This Argument ſeems not unworthy of the *Royal Society*'s Conſideration, to whom I humbly offer the plain Fact as I find it, and would be glad to have their Opinion.

But whether it were really true, that the Obliquity of the Ecliptick was, in the time of *Hipparchus* and *Ptolemy*, really 22 Min. greater than now, may well be queſtioned; ſince *Pappus Alexandrinus*, who lived but about 200 Years after *Ptolemy*, makes it the very ſame that we do. *Vide Pappi Collect. Lib.* VI. *Prop.* 35.

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